Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A wavelength division multiplexer for multiplexing optical input signals, the multiplexer comprising:

a plurality of groups of wavelength converters,

the wavelength converters of a first one of the groups receiving optical input signals with a common wavelength and different optical pump signals and outputting wavelength-shifted output signals, ~~with wavelengths that are differently shifted relative to the common wavelength of the optical input signals~~

the wavelength converters of an mth one of the groups receiving the wavelength-shifted output signals from an m-1th one of the groups and outputting wavelength-shifted output signals with wavelengths that are differently shifted relative to the common wavelength of the optical input signals, where m is an integer greater than 1; and

a coupler combining the wavelength-shifted output signals from the wavelength converters of the mth one of the groups into a multiplexed signal.

2. (currently amended) The multiplexer of claim 1, wherein each of the wavelength converters of the first one of the groups receives a different one of the optical input signals and ~~outputs~~ generates one of the wavelength-shifted output signals ~~to the coupler~~.

3. (canceled)

4. (currently amended) The multiplexer of claim 1, wherein the optical input signals include n optical input signals, and

wherein the plurality of groups of wavelength converters includes:

(a) groups of wavelength converters configured so that each of the n optical input signals passes through a unique set of (a) wavelength converters, where (a) and n are integers greater than 1.

5. (original) The multiplexer of claim 4, wherein the (a) groups of wavelength converters include:

(a) groups of $n^{1/a}$ wavelength converters, a first group of the $n^{1/a}$ wavelength converters receiving the optical input signals and outputting wavelength-shifted output signals to a next group of the $n^{1/a}$ wavelength converters, where ($n^{1/a}$) is an integer greater than 1.

6. (original) The multiplexer of claim 5, wherein each of the wavelength converters in the first group receives $n^{1-(1/a)}$ optical input signals and outputs $n^{1-(1/a)}$ wavelength-shifted output signals.

7. (currently amended) The multiplexer of claim 1, wherein [[each]] at least one of the ~~plurality of~~ wavelength converters includes:

a nonlinear crystal receiving at least one of the optical input signals and at least one of the optical pump signals.

8. (currently amended) The multiplexer of claim 7, wherein [[each]] at least one of the ~~plurality of~~ wavelength converters further includes:

a filter connected to an output of the nonlinear crystal.

9. (original) The multiplexer of claim 1, further comprising:

an amplifier connected to the coupler to amplify the multiplexed signal.

10. (currently amended) The multiplexer of claim 1, further comprising:

a plurality of pump lasers, each of the pump lasers being connected to one of the ~~plurality of~~ wavelength converters and outputting an optical pump signal having a unique wavelength.

11. (currently amended) ~~The multiplexer of claim 1, wherein~~ A wavelength division multiplexer for multiplexing optical input signals, the multiplexer comprising:

a plurality of wavelength converters, the wavelength converters receiving optical input signals with a common wavelength and different optical pump signals and outputting output signals with wavelengths that are differently shifted relative to the common wavelength of the optical input signals, a frequency of one of the output signals output by one of the wavelength converters is a constant multiple of a frequency of one of the optical pump signals minus a frequency of one of the optical input signals; and

a coupler combining the output signals from the wavelength converters into a multiplexed signal.

12. (canceled)

13. (currently amended) A method for wavelength division multiplexing in a system including a plurality of groups of wavelength converters and a coupler, the method comprising:

receiving, by a first group of the wavelength converters, optical input signals with a common wavelength;

receiving, by the first group of wavelength converters, different optical pump signals;

shifting, by the first group of wavelength converters, the common wavelength of the optical input signals based on wavelengths of the optical pump signals to produce differently shifted output signals;

receiving, by an mth group of the wavelength converters, shifted output signals from an m-1th group of the wavelength converters, where m is an integer greater than 1;

shifting the shifted output signals to produce differently shifted output signals; and

combining the shifted output signals from the mth group of the wavelength converters into a combined signal by the coupler.

14. (original) The method of claim 13, further comprising:

filtering unwanted wavelengths from the shifted output signals.

15. (original) The method of claim 13, further comprising:

amplifying the combined signal to produce an amplified signal; and

inputting the amplified signal into an optical fiber.

16. (canceled)

17. (currently amended) The method of claim 13, wherein the system includes:

n wavelength converters in at least the first group of wavelength converters, and

wherein the receiving optical input signals includes:

receiving a different one of n optical input signals by each of the n wavelength converters.

18. (previously presented) The method of claim 13, wherein the system includes:

(a) interconnected groups of $n^{1/a}$ wavelength converters, where (a) and ($n^{1/a}$) are both integers greater than 1, and

wherein the receiving optical input signals includes:

receiving n optical input signals by a first group of $n^{1/a}$ wavelength converters.

19. (previously presented) The method of claim 18, wherein the receiving optical input signals includes:

receiving $n^{1-(1/a)}$ optical input signals by each of the wavelength converters of the first group.

20. (currently amended) ~~The method of claim 13, wherein the shifting includes:~~ A method for wavelength division multiplexing in a system including a plurality of wavelength converters and a coupler, the method comprising:

receiving, by the wavelength converters, optical input signals with a common wavelength;

receiving, by the wavelength converters, different optical pump signals;

shifting, by the wavelength converters, the common wavelength of the optical input signals based on wavelengths of the optical pump signals to produce differently shifted output signals, the shifting includes:

shifting ~~the common~~ a frequency of one of the optical input signals to a constant multiple of a frequency of one of the optical pump signals minus [[a]] the frequency of the one optical input signal; and

combining the shifted output signals into a combined signal by the coupler.

21. (canceled)

22. (previously presented) A wavelength division multiplexer for multiplexing n optical input signals, where n is an integer greater than 1, the multiplexer comprising:

a first group of wavelength converters receiving the n optical input signals and outputting n wavelength-shifted output signals;

a second group of wavelength converters receiving the n wavelength-shifted output signals from the first group and outputting n second output signals, each of the n second output signals having a unique wavelength; and

a coupler combining the second output signals from the second group of wavelength converters into a multiplexed signal,

wherein each of the wavelength converters in the first and second groups receives m input signals and outputs m output signals having wavelengths that are shifted relative to wavelengths of the m input signals, where m is an integer greater than 1.

23. (currently amended) The ~~method~~ multiplexer of claim 22, wherein each of the wavelength converters in the second group is coupled to a plurality of different wavelength converters in the first group, so that each of the n second output signals has passed through a unique pair of wavelength converters.

24. (canceled)

25. (currently amended) ~~A wavelength division multiplexer for multiplexing n optical input signals having a common wavelength from one or more network devices, where n is an integer greater than 1, the multiplexer comprising:~~

~~n wavelength converters, each of the wavelength converters receiving one of the n optical input signals with the common wavelength and an optical pump signal and optically generating~~

~~one output signal having a wavelength that is shifted relative to the common wavelength by a different amount from wavelengths of other ones of the output signals; and~~

~~a coupler combining the output signals from the n wavelength converters into a combined signal,~~

The multiplexer of claim 22, wherein each of the wavelength converters in at least the first group includes:

a nonlinear crystal receiving ~~said one input signal~~ one of the n optical input signals and [[said]] an optical pump signal and optically shifting the wavelength of said one of the n optical input ~~signal~~ signals to produce an intermediate signal, and

a filter connected to an output of the nonlinear crystal to filter the intermediate signal and produce [[said]] one of the n wavelength-shifted output ~~signal~~ signals.

26. (previously presented) A wavelength division multiplexer for multiplexing optical input signals from one or more network devices, the multiplexer comprising:

a first group of wavelength converters, each of the wavelength converters in the first group receiving a plurality of the optical input signals and an optical pump signal and optically generating a plurality of first output signals each having a wavelength that is shifted based on a wavelength of the pump signal;

a second group of wavelength converters, each of the wavelength converters in the second group receiving at least one first output signal from each of the wavelength converters in the first group and an optical pump signal and optically generating a plurality of second output signals each having a wavelength that is shifted based on a wavelength of the pump signal; and

a coupler optically coupled to the second group of wavelength converters to combine the second output signals into a combined signal.

27. (canceled)

28. (previously presented) A method for wavelength division multiplexing in a system including at least two groups of wavelength converters and a coupler that is optically coupled to the groups of wavelength converters, the method comprising:

receiving, by each of a first group of wavelength converters, a plurality of optical input signals;

receiving, by each of the first group of wavelength converters, an optical pump signal;

shifting, by each of the first group of wavelength converters, a wavelength of the plurality of optical input signals based on a wavelength of the optical pump signal to produce a plurality of first output signals;

receiving, by each of a second group of wavelength converters, at least one first output signal from each one of the wavelength converters in the first group;

receiving, by each of the second group of wavelength converters, an optical pump signal;

shifting, by each of the second group of wavelength converters, a wavelength of the at least one first output signal based on a wavelength of the optical pump signal to produce a plurality of second output signals; and

combining the second output signals into a combined signal by the coupler.

29. (currently amended) A wavelength division multiplexing system for transmitting n optical input signals, where n is an integer greater than 1, the system comprising:

~~n wavelength converters, each of the wavelength converters being configured to receive one of n optical input signals having a common wavelength and an optical pump signal and optically generate one output signal having a wavelength that is shifted relative to the common wavelength by a different amount from wavelengths of other ones of the output signals;~~

~~a coupler to combine the output signals from the n wavelength converters into a combined signal;~~

a first group of wavelength converters receiving the n optical input signals and outputting n wavelength-shifted output signals;

a second group of wavelength converters receiving the n wavelength-shifted output signals from the first group and outputting n second output signals, each of the n second output signals having a unique wavelength;

a coupler combining the second output signals from the second group of wavelength converters into a multiplexed signal,

wherein each of the wavelength converters in the first and second groups receives m input signals and outputs m output signals having wavelengths that are shifted relative to wavelengths of the m input signals, where m is an integer greater than 1;

an optical fiber to carry the ~~combined~~ multiplexed signal; and

a splitter to receive the ~~combined~~ multiplexed signal from the optical fiber and produce [[the]] n output signals, each of the n output signals having a wavelength that is shifted relative

to ~~the common~~ a wavelength associated with the n optical input signals by a different amount from wavelengths of other ones of the n output signals.

30. (currently amended) A network, comprising:

one or more network devices ~~selected from the group including switches, routers, and add-drop multiplexers, the devices being~~ configured to produce n optical input signals with a common wavelength, where n is an integer;

a wavelength division multiplexing system configured to receive the n optical input signals with the common wavelength and remotely deliver n optical output signals with different wavelengths, the system including:

a plurality of groups of wavelength converters, [[each]] at least some of the wavelength converters being configured to receive a plurality of the n optical input signals with the common wavelength and an optical pump signal and optically generate a plurality of intermediate output signals, at least some other ones of the wavelength converters being configured to receive the intermediate output signals and optically generate the n optical output signals, each of the n optical output signals having a wavelength that is shifted relative to the common wavelength by a different amount from wavelengths of other ones of the output signals; and

one or more other network devices ~~selected from the group including switches, routers, and add-drop multiplexers, the devices being~~ configured to receive the n optical output signals with different wavelengths.